Fine Particulate Matter

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Division of Air Quality

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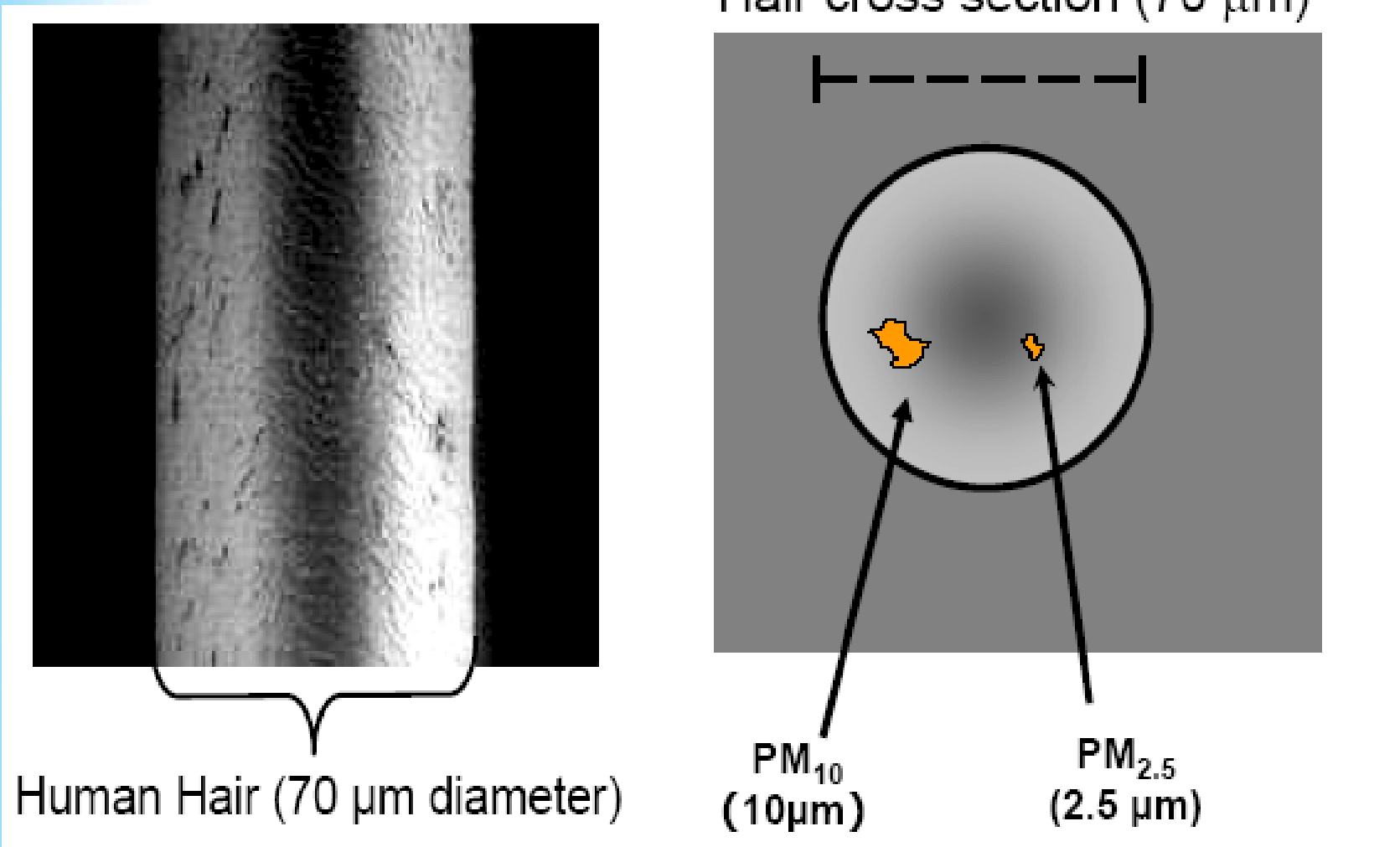
Overview

- What is Fine Particulate Matter?
- Health Effects
- Health-based Standards
- Sources of New Jersey’s Emissions
- What New Jersey needs to do

Fine Particulate Matter: What is it?

A complex mixture of extremely small particles and liquid droplets that measure ≤ 2.5 µm in diameter



M. Lipsett, California Office of Environmental Health Hazard Assessment

Fine Particles Can Be Emitted Directly or Formed in the Air from Gases

Sources of $PM_{2.5}$

- Primary Particles
  - Combustion of fossil fuels
  - Construction / Agricultural
  - Wild fires
- Secondary Particles
  - SO_2
  - NO_x
  - VOC

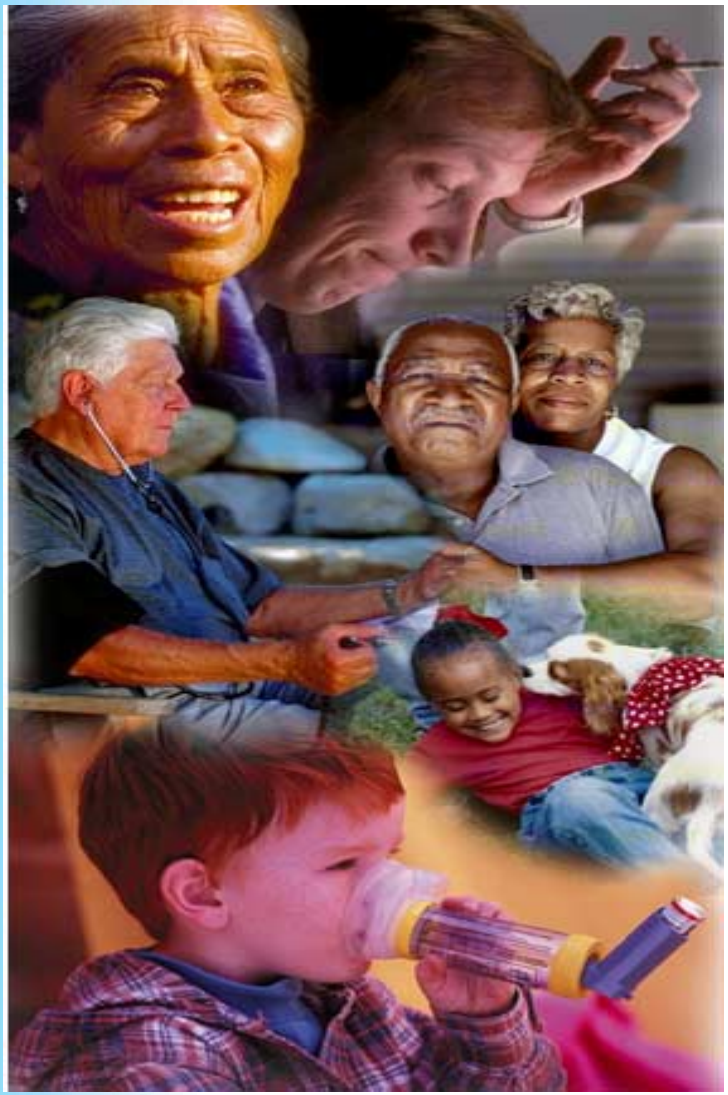
Fine Particulates – Health Effects

- Premature death
- Respiratory related hospital admissions and emergency room visits
- Aggravated asthma
- Coughing and difficulty or pain breathing
- Chronic bronchitis
- Decreased lung function
- Diesel carcinogen
- Work and school absences

Every year in New Jersey, exposure to fine particulate pollution above the current annual standard results in…

- More than 1,000 premature deaths
- Up to 68,000 asthma attacks

Groups More at Risk



- People with heart or lung disease
- Older adults
- Children

Environmental Effects of $PM_{2.5}$

- Main contributor to poor visibility (Regional Haze)
- Damage to trees and many sensitive forest soils
- Accelerates the decay of building materials

Particulate Matter Health-based Standards

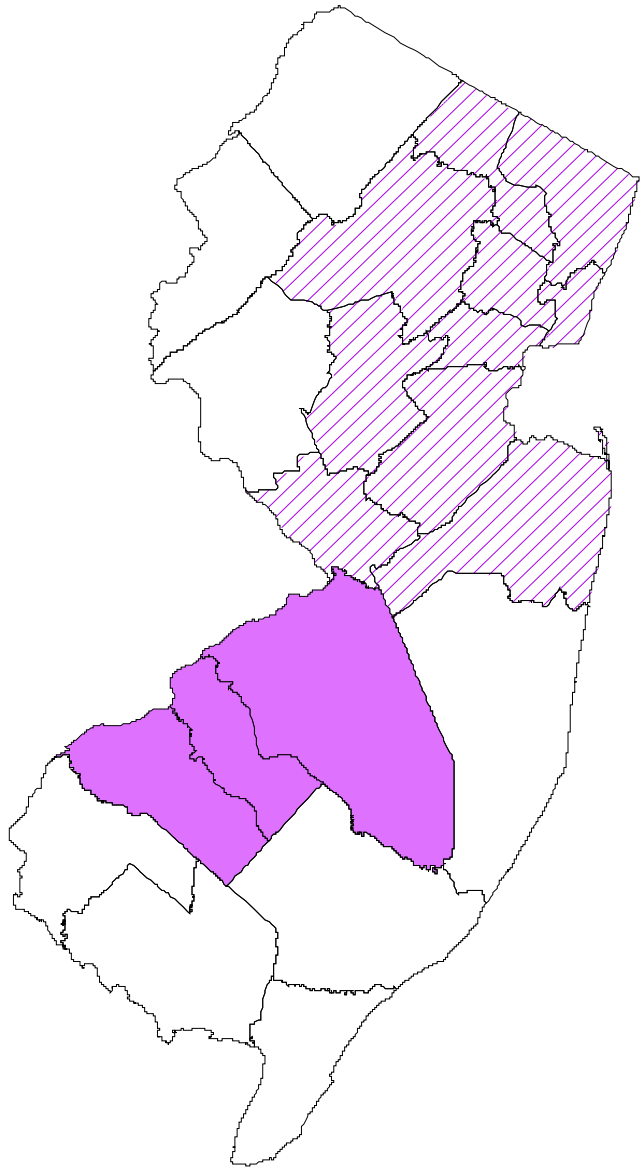
In 1997, the USEPA established National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ for the first time. At the same time, they also revised NAAQS for PM_{10}:

- For $PM_{2.5}$:
  - 15 µg/m^3 (annual)
  - 65 µg/m^3 (daily)
  - Entire state meets daily standard but two counties in northern NJ currently exceed annual standard
- For PM_{10}:
  - 50 µg/m^3 (annual)
  - 150 µg/m^3 (daily)
  - Entire state of New Jersey is in attainment

New Standards Under Consideration

- Clean Air Science Advisory Committee
  - EPA's external science panel
- Annual Standard -
  - 13 - 14 µg/m^3
- Daily Standard -
  - 30 - 35 µg/m^3

USEPA Designations of Nonattainment Areas for PM2.5 in New Jersey

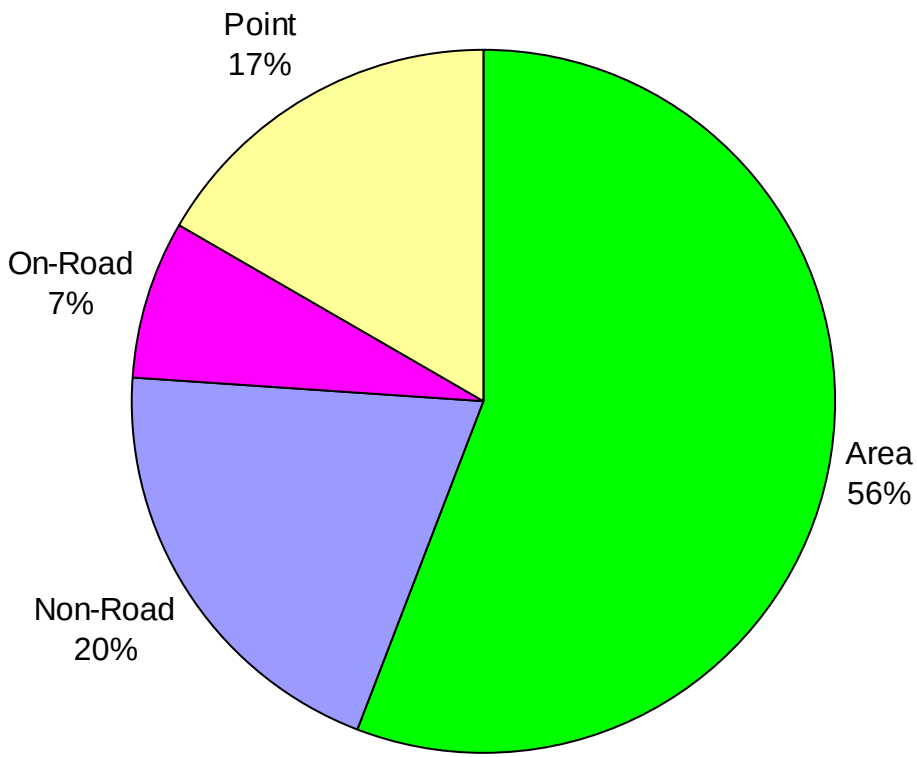


USEPA Designations

- In Attainmnet
- NY/NJ/LI/CT Nonattainment Area
- PA/NJ/DE Nonattainment Area

Effective
April 5, 2005

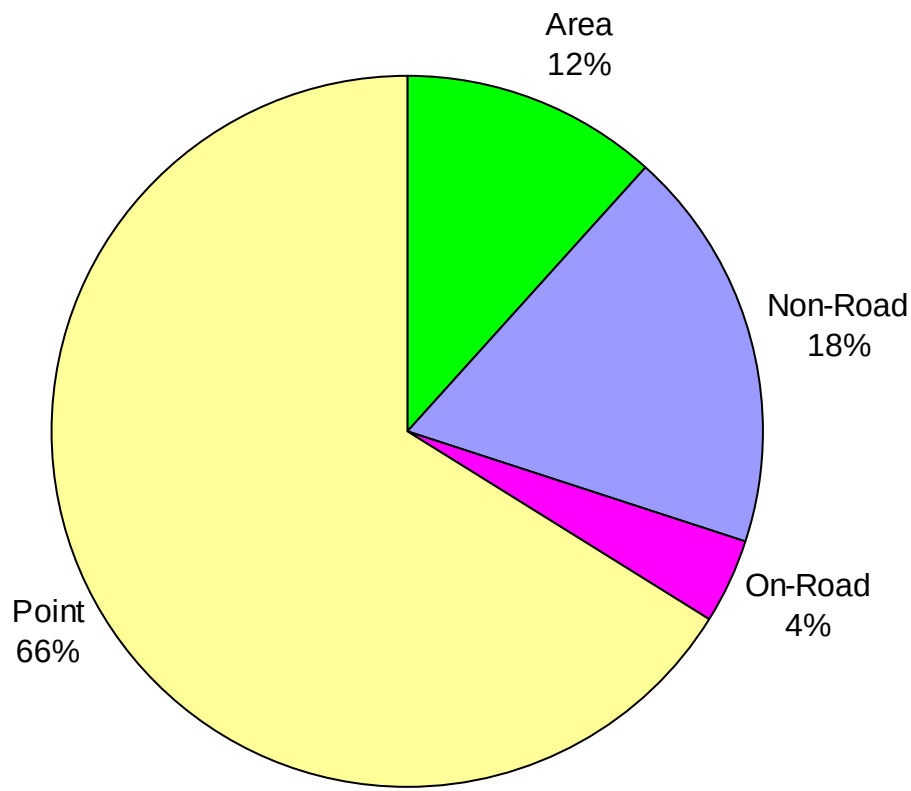
DRAFT 2002 New Jersey $PM_{2.5}$ Emissions by Sector



Total $PM_{2.5}$ Emissions - 29,103 tpy

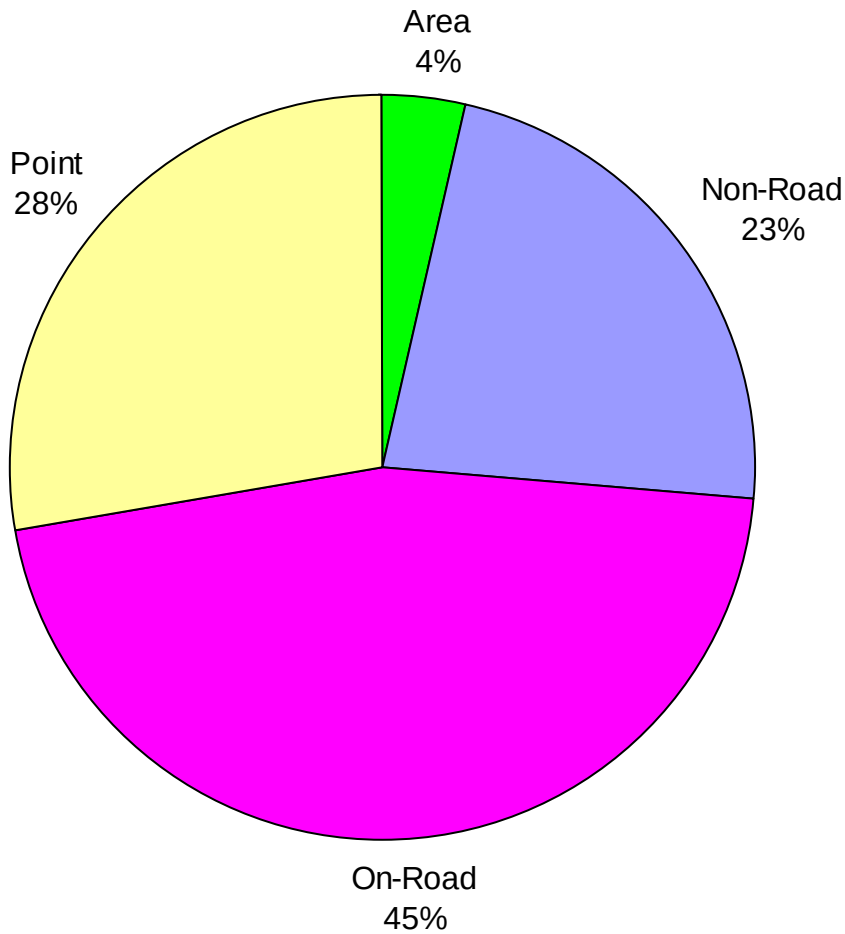
(Includes Adjusted Fugitive Dust Emissions)

DRAFT 2002 New Jersey SO2 Emissions by Sector



Total SO2 Emissions - 88,936 tpy

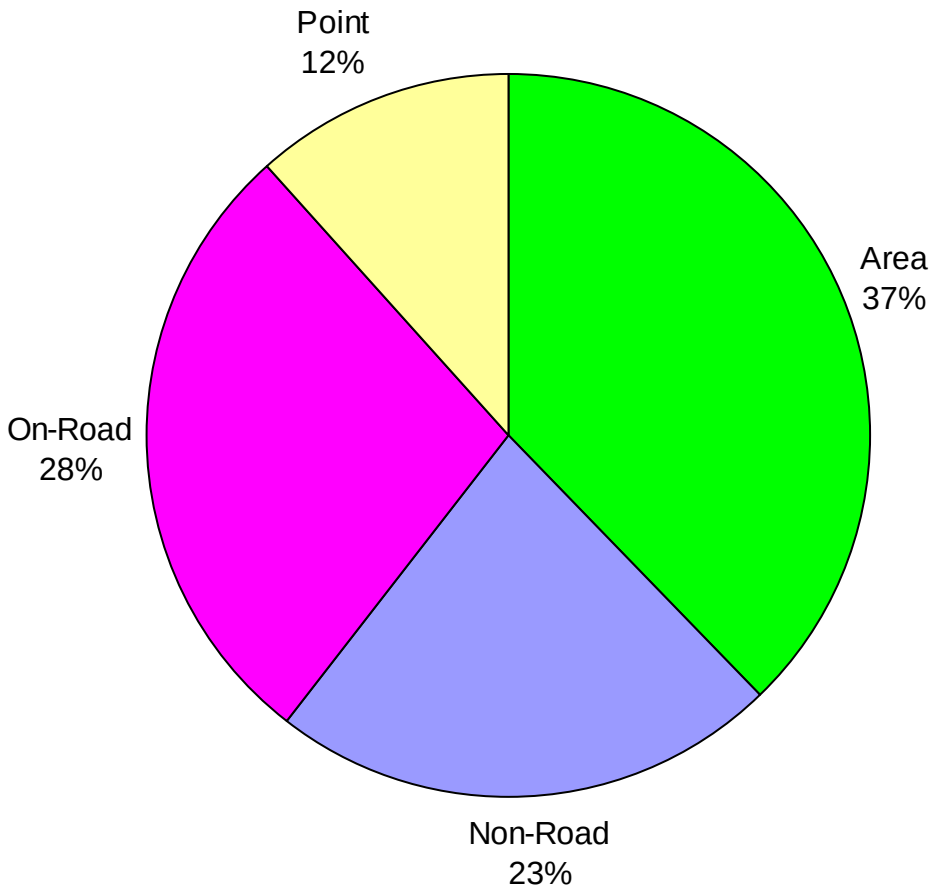
DRAFT 2002 New Jersey NO_x Emissions by Sector



Total No_x Emissions - 1,009 tpd

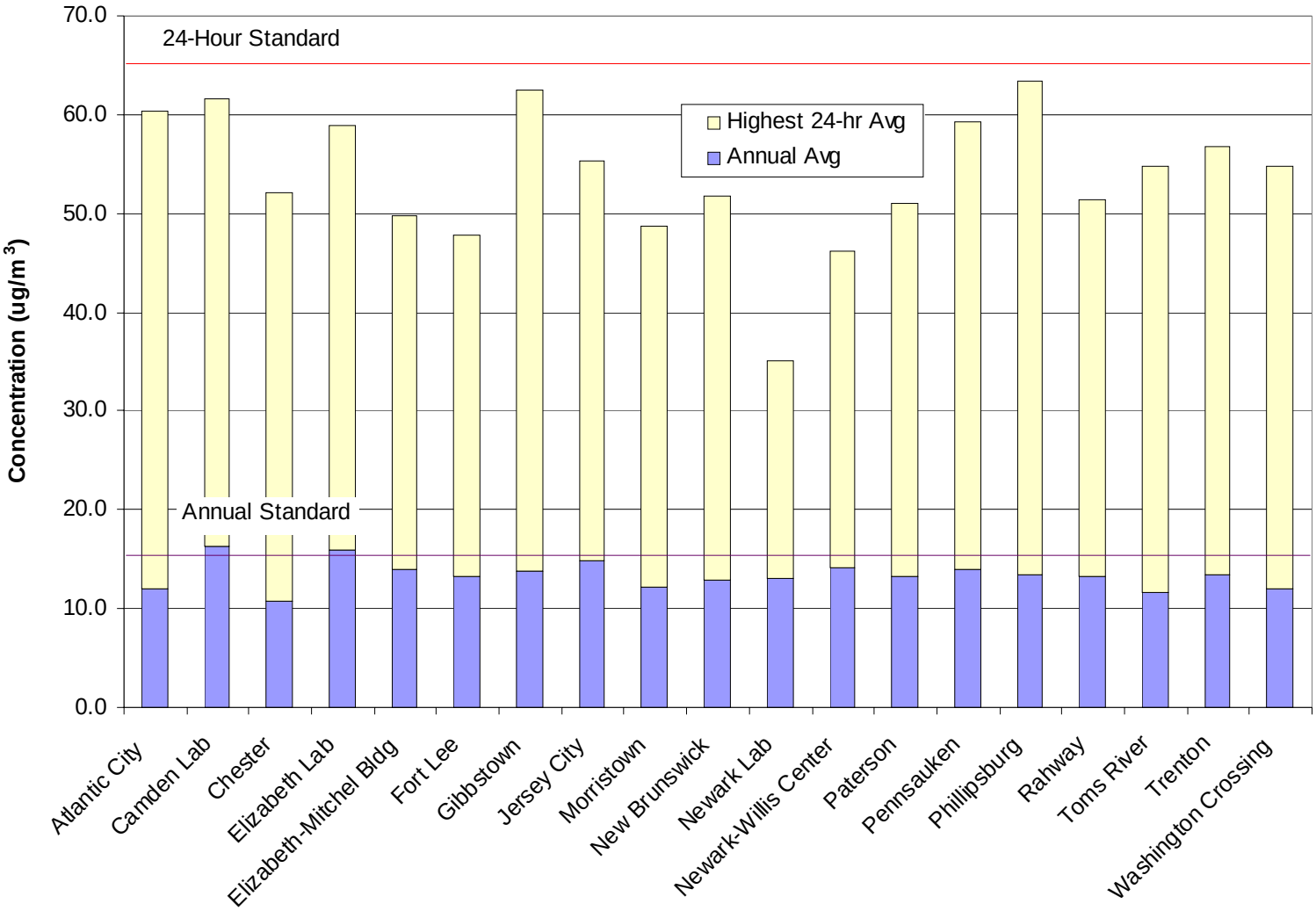
(Anthropogenic sources only)

DRAFT 2002 New Jersey VOC Emissions by Sector

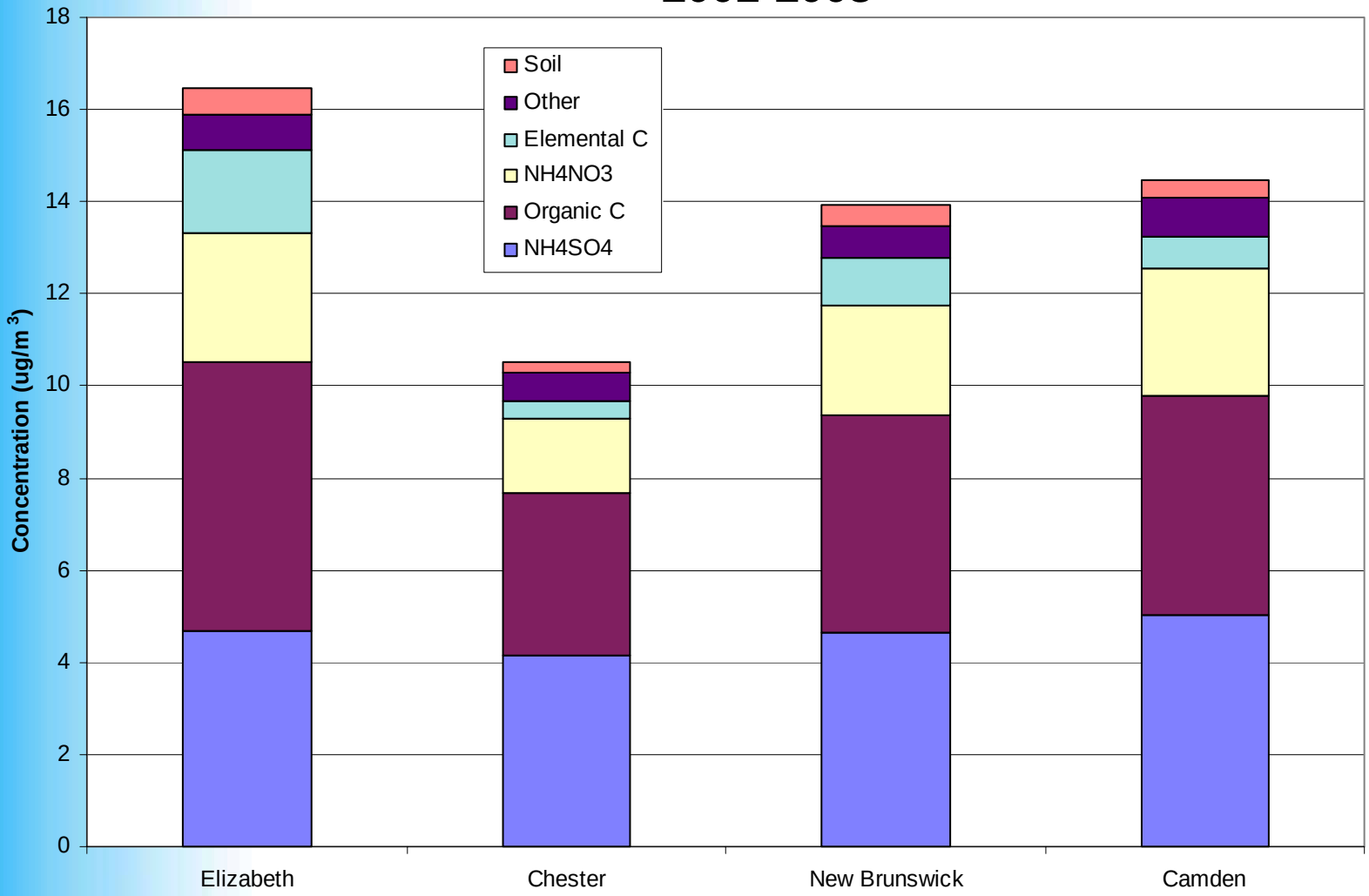


Total VOC Emissions - 977 tpd
(Anthropogenic sources only)

2003 Fine Particle ($PM_{2.5}$) Concentrations

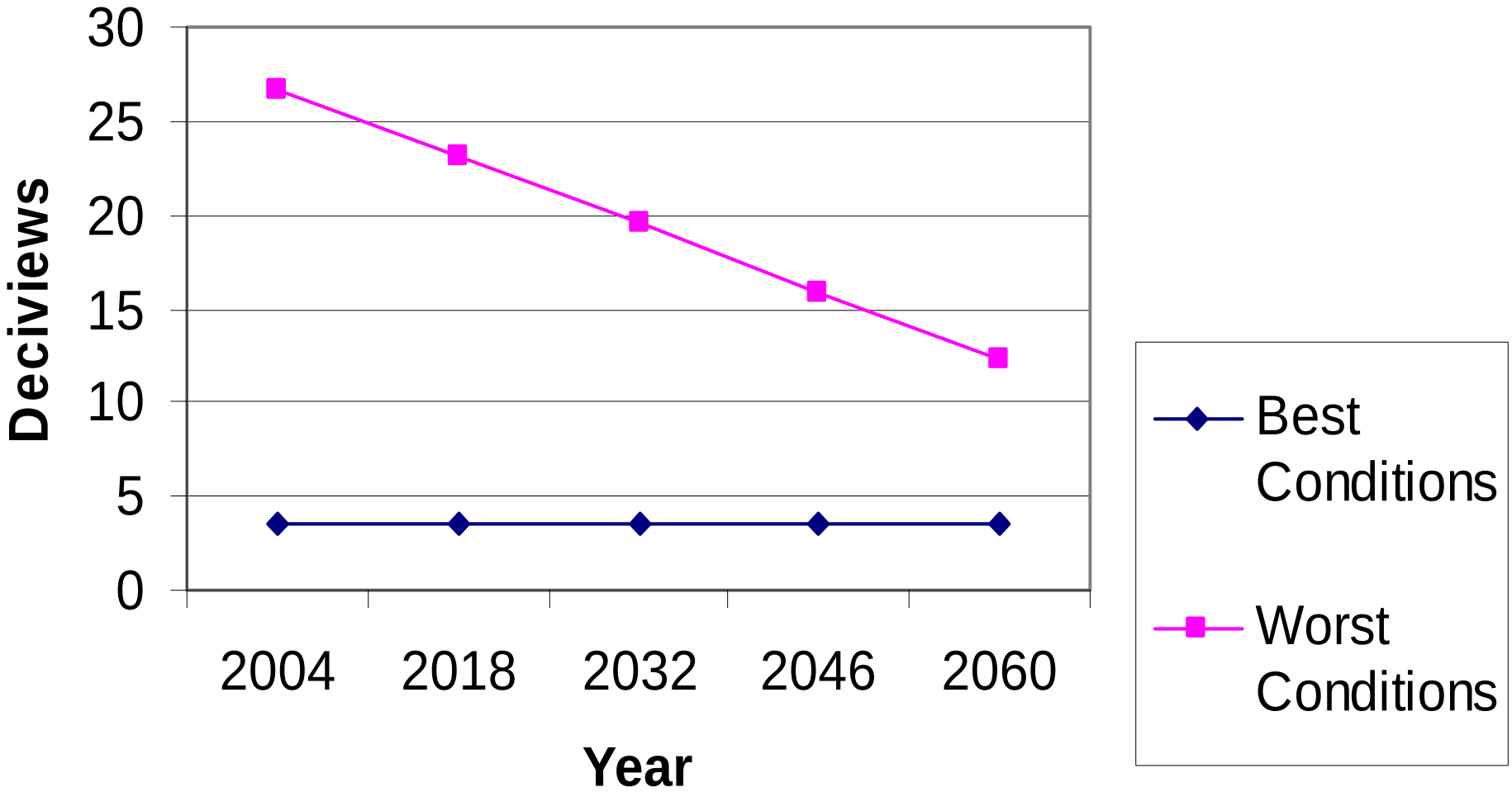


$PM_{2.5}$ Components at New Jersey Speciation Sites 2001-2003



Edwin B. Forsythe National Wildlife Refuge

Deciview Reductions Needed by the Year 2064



Fine Particles Reduce Visibility

Clear day

Hazy Day

New Jersey SIP Schedule

- 2005 - 2006 - 2002 Emission Inventory
- April 2007 - Reasonably Available Control Technology (RACT)
- December 2007 - Regional Haze
- April 2008 - Reasonably Available Control Measure (RACM)
  - New Source Review (NSR)
  - Attainment Demonstration

New Jersey's Internal Plan

- Control Measures - September 2005
- Projection inventory - End of 2005
- Modeling - January thru May 2006
- Rules - On-going as needed

USEPA $PM_{2.5}$ Implementation Rule

- Proposal for $PM_{2.5}$ implementation rule is scheduled to come out this summer
  - Attainment dates
  - Classifications
  - $PM_{2.5}$ precursors
  - Reasonably available control technology (RACT)
  - Reasonably available control measures (RACM)
  - Rate of progress (ROP)

$PM_{2.5}$ New Source Review (NSR)

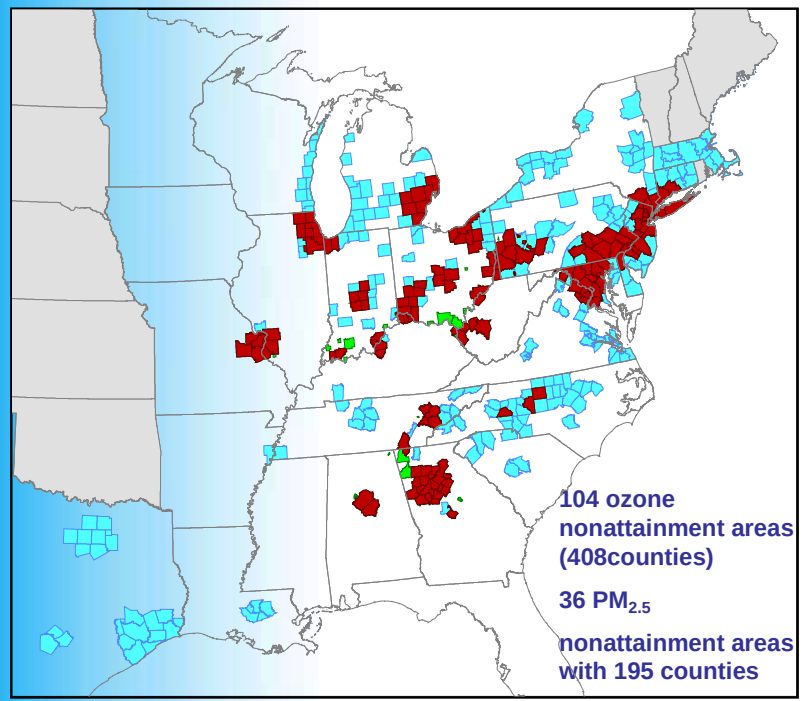
- New Jersey required to issue major source NSR permits that address Section 173 of the Clean Air Act once nonattainment designations for $PM_{2.5}$ became effective

- USEPA proposed an interim guidance for $PM_{2.5}$ New Source Review (NSR) in April 2005, and is expected to come up with a final rule in 2006

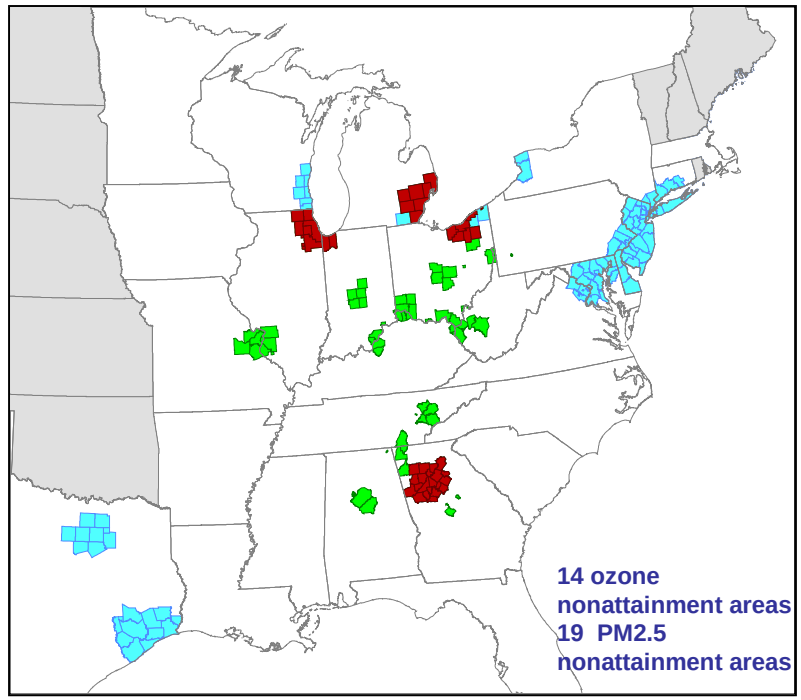
- EPA is providing guidance for $PM_{2.5}$ because it is a new NAAQS. NSR continues to apply in nonattainment areas

Ozone and PM Attainment forecast with CAIR and with Other Clean Air Programs - 2010

Ozone and Fine Particle Nonattainment Areas (April 2005)



Projected Nonattainment Areas in 2010 after Reductions from CAIR and Existing Clean Air Act Programs



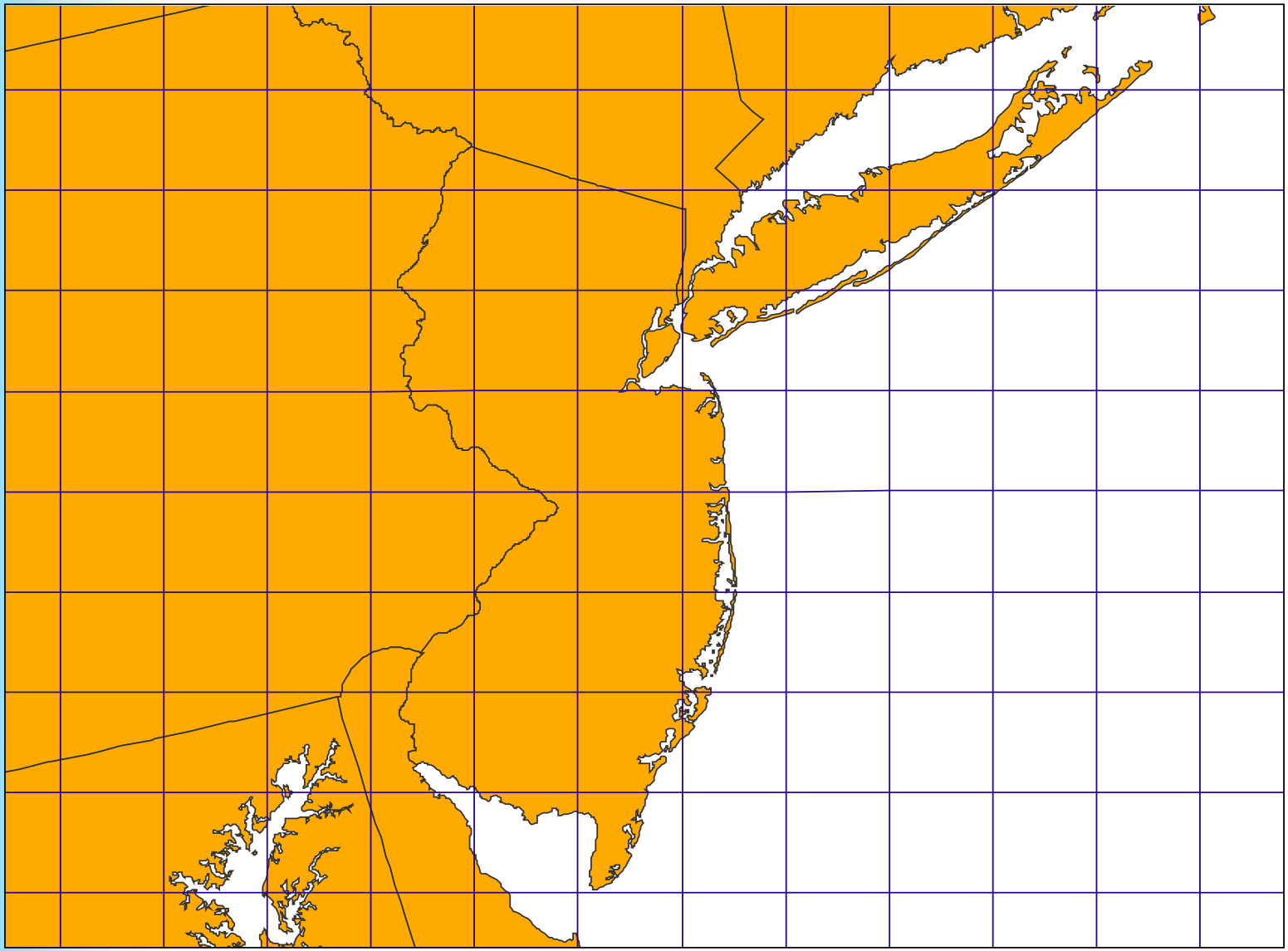
Nonattainment areas for 8-hour ozone pollution only

Nonattainment areas for fine particle pollution only .

Nonattainment areas for both 8-hour ozone and fine particle pollution

Projections concerning future levels of air pollution in specific geographic locations were estimated using the best scientific models available. They are estimations, however, and should be characterized as such in any description. Actual results may vary significantly if any of the factors that influence air quality differ from the assumed values used in the projections shown here.

CAIR Modeling Grid for New Jersey



Results of CAIR modeling

City	99-03 Average PM2.5 Concentration (ug/m3)	2010 PM2.5 Concentration (after CAIR) (ug/m3)	2015 PM2.5 Concentration (after CAIR) (ug/m3)
Baltimore	17.18	14.88	14.51
Philadelphia	16.55	14.98	14.53
New York	17.56	14.95	14.33

Some of the larger metropolitan areas in the Northeast are predicted to have PM2.5 levels in 2010 that are just below the standard, but appear to have moved to much lower levels by 2015.

Source: USEPA modeling

Conclusion

- Elevated fine particle levels have significant health and welfare impacts
- New Jersey needs to reduce emissions to meet air quality standards
- Deadlines for State Implementation Plans are fast approaching

For more information ...

- Technology Transfer Network, National Ambient Air Quality Standards (NAAQS) URL:www.epa.gov/air/criteria.html
- National Air Quality 2001 Status and Trends URL:www.epa.gov/airtrends/
- www.epa.gov/pmdesignations
- www.epa.gov/cleanairinterstaterule
- www.state.nj.us/dep/airmon